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ART. XXI.—Notes on some Tertiary Leaves from Pascoe Vale.

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(With Plates XIII. and XIV.)

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Source of the Material.

Some of the leaf remains from a Tertiary deposit collected, in conjunction with Mr. W. Hanks, from the Moonee Ponds Creek during 1933, are in a fairly good state of preservation, and seem to be of sufficient interest to put on record.

The leaf impressions are generally of a light-brown colour, though in some instances they vary from a light to dark grey. The venation in several of the leaves is very distinct. So far, not many perfect specimens have been found, but portions of leaves and stems are often so thickly intermingled as to make identification impossible. The soft and crumbling nature of the rock made the handling of these specimens somewhat difficult.

The leaves belong to a vegetation chiefly of the brush type, though among them are forms resembling those of *Eucalyptus* and *Banksia*. Three minute compressed leaves were discovered between the layers of brown pipe-clay. (Plate XIII., fig. 4.) They are so small that identification is difficult, but they resemble *Eucalyptus* and *Nothofagus*.

It is unsatisfactory to attempt to catalogue many of the fossil plants according to their generic relationship on the evidence of the leaves alone; as more fruits and stems are found in this deposit, however, better proof will be forthcoming. The naming of these specimens may therefore be open to future corrections.

The following are the determinations now made on these leaf remains from Pascoe Vale:—

- Nothofagus* cf. *Maideni* (Deane).
- N.* cf. *Benthami* (Ettingshausen).
- N.* cf. *Muelleri* (Ettingshausen).
- Ficorium nitidum*, sp. nov.
- Magnolia microphylla*, sp. nov.
- Lomatia* cf. *Brownii* Ettingshausen.
- Nephelites* cf. *berwickense* Deane.
- Pomaderris Banksii* Ettingshausen.
- Bombax Mitchelli* Ettingshausen.
- Eucalyptus Kitsoni* Deane.
- cf. *Cordia tasmanica* Ettingshausen.

Description of the Leaves.

ANGIOSPERMEAE (DICOTYLEDONES)

FAGACEAE.

NOTHOFAGUS cf. MAIDENI (Deane).

(Pl. XIII., fig. 3.)

Fagus Maiden Deane, 1902, p. 30, pl. vii., fig. 10.*Fagus (Nothofagus) Maiden* Chapman, 1921, p. 118, pl. viii., fig. 3.

Observations.—The upper surface of the leaf is shown, measuring 60 mm. long and 22 mm. wide. Surface smooth and of delicate texture. In shape narrowly ovate and oblique at the base. Midrib straight, lateral veins nearly so, extending to the points of the teeth on the serrate margin and at an angle of 35° from the midrib. The leaf has the general characters of the *Fagus* group and closely resembles that figured by Deane from the Berwick leaf-beds.

NOTHOFAGUS cf. BENTHAMII Ettingshausen.

(Pl. XIII., fig. 5.)

Fagus Benthami Ettingshausen, 1888, p. 119, pl. x., fig. 9.

Deane, 1902, pl. xvii., fig. 5.

Observations.—This specimen shows a thin-textured leaf (not figured), 76 mm. long and about 25 mm. wide. The margins are not well preserved, but there is sufficient evidence to show that they are distinctly denticulate. The lamina narrows towards the base, which is slightly obtuse, showing a petiole about 9 mm. in length. The secondary veins arise at an acute angle from the midrib and are about 8 mm. distant from each other; tertiary veins are at right angles to them. The fact that several *Nothofagus* fruits have been found resembling *N. Benthami* (see fig. 5) seems to justify the placing of this fossil provisionally under that species.

NOTHOFAGUS cf. MUELLERI Ettingshausen.

(Pl. XIII., figs. 1, 2.)

Fagus Muelleri Ettingshausen, 1888, p. 117, pl. x., figs. 3-7, 7A.

Deane, 1902, p. 29, pl. vii., fig. 8.

Observations.—These leaf impressions, upper and lower surfaces, are almost perfect and remarkably distinct. They resemble the figures recorded by Deane from Wilson's quarry, Berwick, as well as those given by Ettingshausen in his "Contributions to the Tertiary Flora of Australia," cited above, from Vegetable Creek, New South Wales.

NOTHOFAGUS WILKINSONI Ettingshausen.

(Pl. XIII., fig. 7.)

Fagus Wilkinsoni Ettingshausen, 1888, p. 32, pl. ii., fig. 1.

Observations.—The present occurrence is a well-preserved leaf, referable to the above species. It agrees in size, venation, and other characteristics with Ettingshausen's figured example, which comes from Dalton, near Gunning, New South Wales.

Family MOREAE.

FICONIUM NITIDUM, sp. nov.

(Pl. XIII., fig. 6.)

Observations.—This specimen shows a perfect impression of a leaf about 55 mm. long and 17 mm. wide, recalling *Ficonium Solanderi* Ettingshausen (1885, p. 38, pl. iii., fig. 4), but of a neater type. The substance of the leaf is firm, margin entire, and with a strong, straight midrib; in the secondary veining there is much irregularity and the tertiary veins are quite inconspicuous. The base of the leaf is very narrow compared with *F. Solanderi*, and the apex is roundly acuminate, instead of sharply pointed as in that species.

Family MAGNOLIACEAE.

MAGNOLIA MICROPHYLLA, sp. nov.

(Pl. XIII., fig. 8.)

Observations.—This specimen, not quite perfect, is a large ovate, thick-textured leaf, with a firm and entire margin. The strong midrib narrows to the apex, and the secondary veins, which are distinct, are placed at unequal distances from each other, slightly curved and flexuose. The tertiary veins are feebly shown. This type of leaf may be compared with *Magnolia Brownii* Ettingshausen (1888, p. 59, pl. v., fig. 7), but is of smaller dimensions and has more widely spaced secondary veins. The type measured, when complete, circ. 10 cm., with a width of 5 cm.

Family PROTEACEAE.

LOMATIA cf. BROWNII Ettingshausen.

(Pl. XIV., fig. 9.)

Lomatia Brownii Ettingshausen, 1888, p. 135, pl. xii., figs. 4-5.

Observations.—This leaf bears a fairly close resemblance to the type figured by Ettingshausen. The actual apex is missing but apparently tapered; the base is narrowed. Texture thick, midrib strongly marked, whilst the lateral veins are distinct and run acutely from the midrib, reaching the margins at the points of the denticulae. Tertiary veining is very distinctly reticulate. Length of leaf about 75 mm. when complete, and width 26 mm.

In certain characters this leaf also resembles *Lomatia reticulata* Deane (1902, p. 28, pl. iv., fig. 8), but in that species the marginal teeth are more widely spaced and irregular than in *Lomatia Brownii*, to which this specimen is provisionally referred.

Family SAPINDACEAE.

NEPHELITES cf. BERWICKENSE Deane.

(Pl. XIV., fig. 10.)

Nephelites berwickense Deane, 1902, p. 23, pl. vi., fig. 9.

Observations.—The leaf somewhat resembles *Quercus Dampieri* Ettingshausen (1888, pl. ix., fig. 15), and also that of *Nephelites denticulata* figured in Deane's "Tertiary Leaves from Bungonia" (1902, p. 16, pl. xvi., fig. 5). The eccentric midrib might even suggest its being the portion of a compound leaf. The margin is dentate towards the apex, whilst the midrib is well marked with secondary veins. The general characteristics link it with species of the living genus *Nephelium*.

Family RHAMNACEAE.

POMADERRIS BANKSII Ettingshausen.

(Pl. XIV., fig. 11.)

Pomaderris Banksii Ettingshausen, 1888, p. 165, pl. xiv., fig. 10, pl. xv., figs. 1-2.

Observations.—A perfect firmly-textured leaf is comparable with the above species; the leaf is oblong in shape, with the margin slightly waved or even dentate. Midrib prominent, secondary veins curving out and ascending to the margin; tertiary veins run transversely to the leaf axis and are very fine, flexuous, and anastomosing. The leaf is about 85 mm. long and 17 mm. wide. Ettingshausen's specimens were recorded from Vegetable Creek, New South Wales.

Family STERCULIACEAE.

BOMBAX MITCHELLI Ettingshausen.

(Pl. XIV., fig. 12.)

Bombax Mitchellii Ettingshausen, 1888, p. 61, pl. vi., fig. 3.

Observations.—This leaf resembles the one figured by Ettingshausen from Dalton, New South Wales. The present example shows a portion of a large obovate leaf, of rigid texture, with an entire margin and a strongly contracted base. The midrib is straight and prominent; the secondary veins are distinct and of unequal strength, being stouter at the base; they ascend to the margin in a more or less bold curve. The tertiary veins are branched and have acute angles. The development of the leaf is not symmetrical; its form closely compares with those previously figured from Dalton, near Gunning, New South Wales.

Family MYRTACEAE.

EUCALYPTUS KITSONI Deane.

Eucalyptus Kitsoni Deane, 1902, p. 25, pl. iv., figs. 5, 6, 7.

Chapman, 1926, p. 185, pl. xiii., fig. 6. Maiden, 1922, p. 188, pl. ccxxiii., figs. 100-c.

Observations.—Portion of a linear leaf was found, showing the intra-marginal vein close to the edge. The lateral veins are fine, close together, and parallel, as they proceed from the midrib, though indistinct. The leaf also resembles *E. Hayi* (Ettingshausen, 1888, p. 171, pl. xv., figs. 4-5) in certain features, but on comparing it with the specimens of *E. Kitsoni*, recorded from Berwick and Narracan, the resemblance is seen to be closer to the latter species, since the lateral veins are much more crowded and longer than in *E. Hayi*. The veins also leave the midrib at a more acute angle than in *E. Hermani* (Deane, 1902, p. 25, pl. iv., figs. 3-4).

Family BORAGINEAE.

cf. *CORDIA TASMANICA* Ettingshausen.

(Pl. XIV., fig. 13.)

Cordia tasmanica Ettingshausen, 1888, p. 54, pl. v., fig. 3.

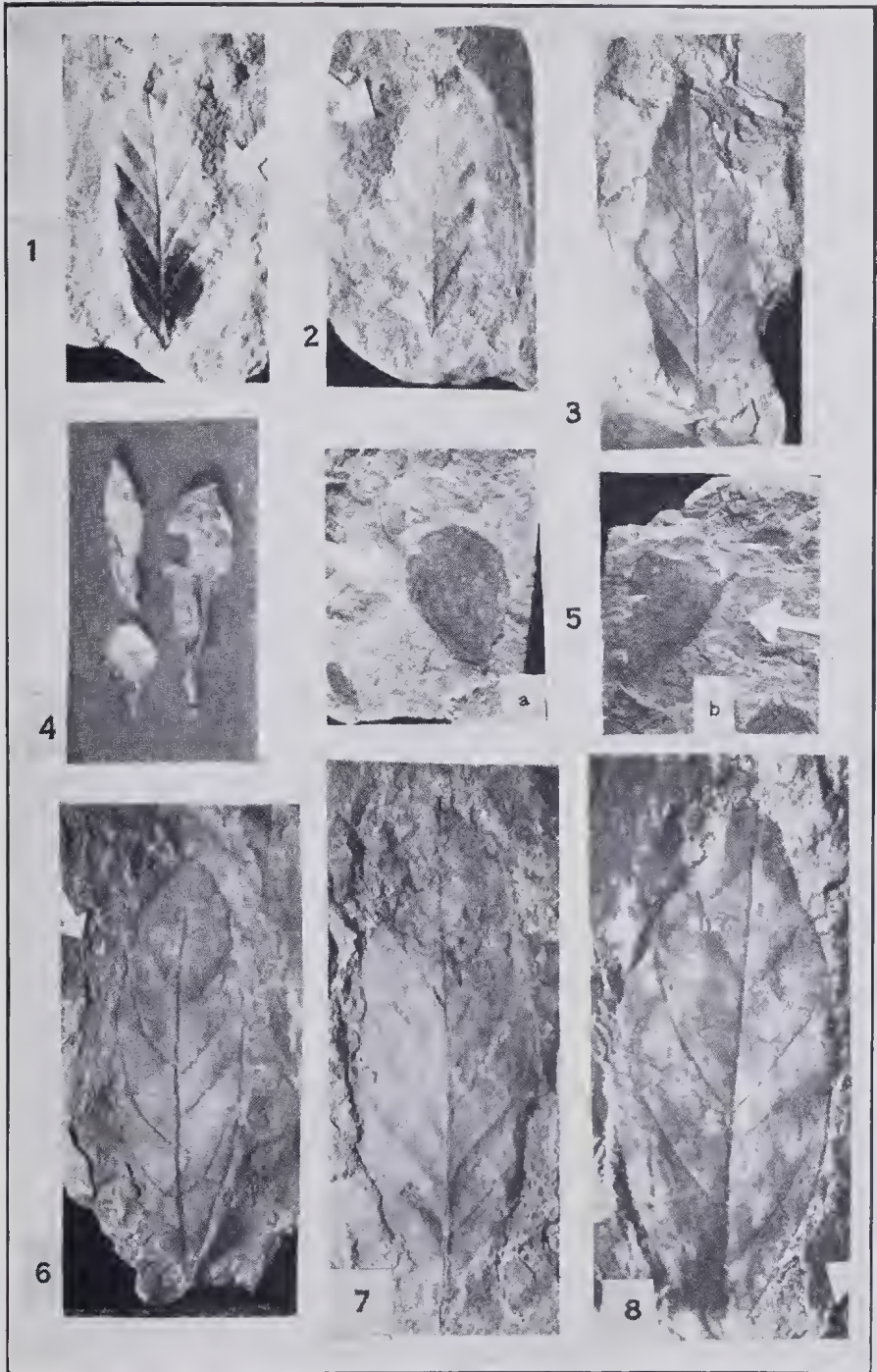
Observations.—An imperfect leaf occurs here, the identity of which is in some doubt. In shape and veining it apparently resembles the above species, but being incomplete it can only provisionally be referred to this form. The original record was from the estuarine deposits of the River Derwent, Tasmania.

Summary.

The Moonec Ponds leaf-beds occur under the Older Basalt, and form part of the Tertiary strata extending from North Essendon to Heidelberg. These beds consist of sand and leaf-bearing clays, with the Newer Basalt cutting through in places.

It is interesting to note in this newly discovered leaf-bed that some of the impressions found closely resemble types of leaves recorded from Berwick and Narracan. Fragments of *Cinnamomum* and *Laurus* also occur, and it is possible that complete forms will also be found similar to *Cinnamomum polymorphoides*. These facts tend to indicate that this leaf-bed belongs to the same pre-Older Basaltic series as the tertiary deposits described from Berwick and Narracan by Henry Deane and F. Chapman.

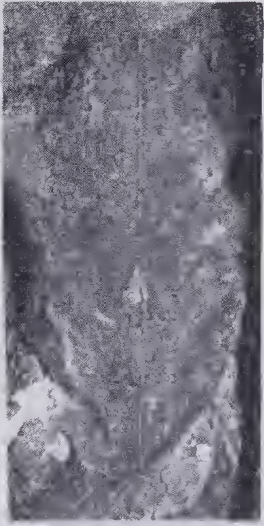
In conclusion I should like to thank Mr. F. Chapman for his invaluable help in the preparation of these notes, and Mr. A. A. C. Carter, who kindly photographed the specimens.



A. A. C. Carter, photo.]

Tertiary Leaves. Pascoe Vale, Victoria.

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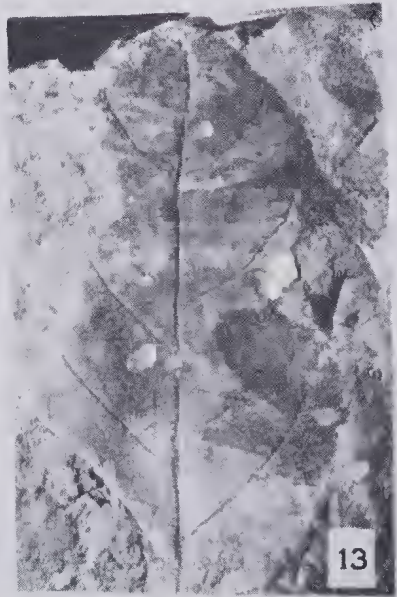
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A. A. C. Carter, photo.

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Explanation of Plates.

PLATE XIII.

- FIG. 1.—*Nothofagus* cf. *Muelleri* Ettingshausen. Upper surface. Circ. nat. size.
- FIG. 2.—*Nothofagus* cf. *Muelleri* Ettingshausen. Lower surface. Circ. nat. size.
- FIG. 3.—*Nothofagus* cf. *Maideni* Deane. Circ. nat. size.
- FIG. 4.—Compressed leaves (?) *Eucalyptus*; (?) *Nothofagus*. $\times 1\frac{1}{2}$.
- FIG. 5.—Fruits; (a & b) cf. *Nothofagus Benthami* Ettingshausen. Nat. size.
- FIG. 6.—*Ficonium nitidum*, sp. nov. Nat. size.
- FIG. 7.—*Nothofagus Wilkinsoni* Ettingshausen. Circ. nat. size.
- FIG. 8.—*Magnolia microphylla*, sp. nov. Circ. nat. size.

PLATE XIV.

- FIG. 9.—*Lomatia* cf. *Brownii* Ettingshausen. Nat. size.
- FIG. 10.—*Nephelites* cf. *berwickense* Deane. Nat. size.
- FIG. 11.—*Pomaderris Banksii* Ettingshausen. $\frac{2}{3}$ nat. size.
- FIG. 12.—*Bombax Mitchellii* Ettingshausen. $\frac{2}{3}$ nat. size.
- FIG. 13.—cf. *Cordia tasmanica* Ettingshausen. Circ. nat. size.